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Effects of Body Position on Facial Recognition in Police Body-Worn Cameras

Julia M. Bryan, Graduate Student (PhD), Technology Advisor: Dr. Stephen J. Elliott

Background

- Body-worn cameras (BWCs) are a popular tool in law enforcement, but also controversial
- Have video and audio recording capability
- Primarily used by law enforcement agencies in the United States for officer accountability¹
- Successful implementation of facial recognition in BWCs could enhance officer safety

Proposed Evaluation

- Phase 1: Collection of qualitative data with Lafayette Police Department (LPD) officers regarding experiences, preferences in BWC use
- Phase 2: Collection of quantitative data on how variations in LPD officers' body positions affect facial recognition accuracy for a stationary target
- CEO of Axon (leading BWC manufacturer): facial recognition not yet accurate enough for BWCs²
- Amazon has tested BWC facial recognition in at least two U.S. cities despite known inaccuracies³

Problem: Facial recognition works well in controlled conditions with stationary cameras, but police officers work in uncontrolled conditions with non-stationary cameras; officer body position may negatively impact accuracy.

Research Questions

 Does a BWC wearer's trunk movement in the transverse plane (clockwise and counterclockwise rotation from the hips) affect the target's match score?

- <u>Equipment</u>:
 - Microsoft Kinect v2 (kinetic capture system)
 - Axon Body 2 BWC
 - Digital video camera to record scene
 - Neurotechnology facial recognition software
- Participants:

BWC wearers: Right-handed LPD officers
(target N = 35) in patrol uniform, including
protective vest, duty belt; interview stance *BWC target*: Caucasian male, no facial hair,
identity known to system; stationary

• Experimental setup (LPD tactics room):



- 2. Does a BWC wearer's trunk movement in the sagittal plane (flexion and extension from the hips) affect the target's match score?
- 3. Does a BWC wearer's trunk movement in the coronal plane (flexion and extension of the knees) affect the target's match score?





Facial recognition depiction (Getty)

- <u>Method</u>:
 - Manipulate, measure changes in common policing stance (interview stance)
 - Evaluate positional effects on accuracy of a known facial recognition target

References

¹ Police Executive Research Forum (2018). Cost and benefits of body-worn camera deployments, (April), 1–73. Retrieved June 12, 2018, from http://www.policeforum.org/assets/BWCCostBenefit.pdf

² Cordiero, M. (2018, August 9). Largest body camera supplier in U.S. says facial recognition isn't good enough yet for police work. Retrieved February 23, 2019, from https://www.orlandoweekly.com/Blogs/archives/2018/08/09/largest-body-camera-supplierin-us-says-facial-recognition-isnt-good-enough-yet-for-police-work

³ Koebler, J. (2018, May 22). Amazon is selling cheap, real-time facial recognition technology to cops. Retrieved July 3, 2018, from

https://motherboard.vice.com/en_us/article/3k4dq5/amazon-rekognition-facial-recognition-cops-body-cameras



